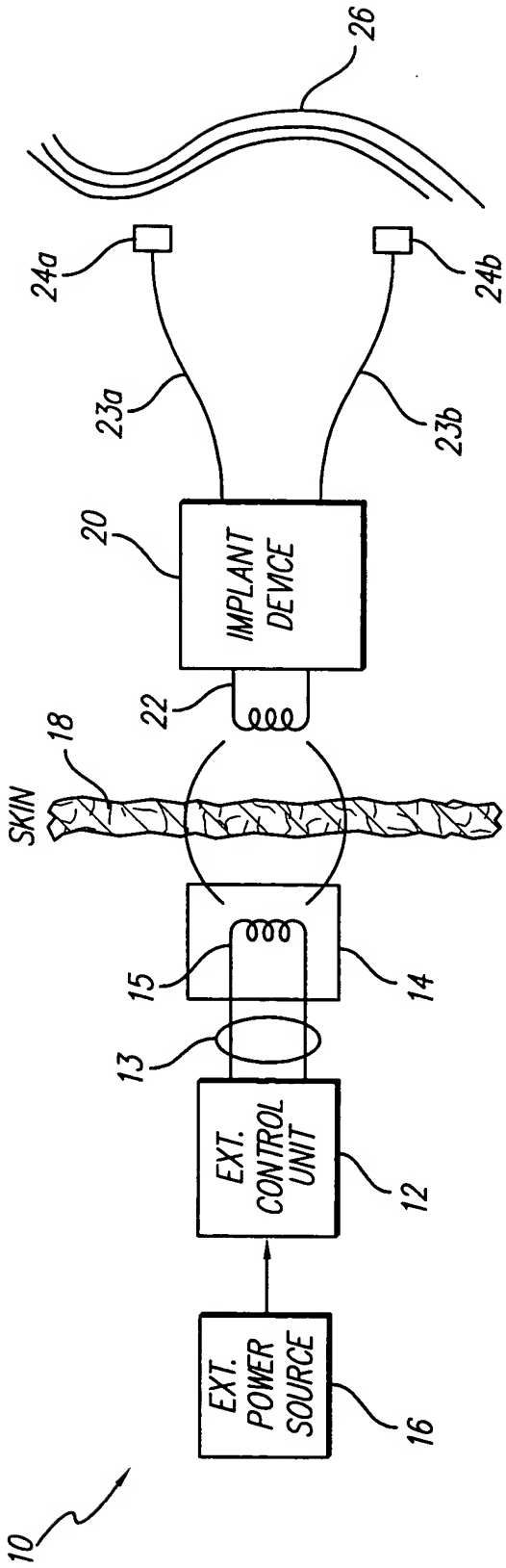

10
EXT. POWER SOURCE
16
EXT. CONTROL UNIT
12
13
15
14
SKIN
18
22
IMPLANT DEVICE
20
23a
23b
24a
24b
26

FIG. 1

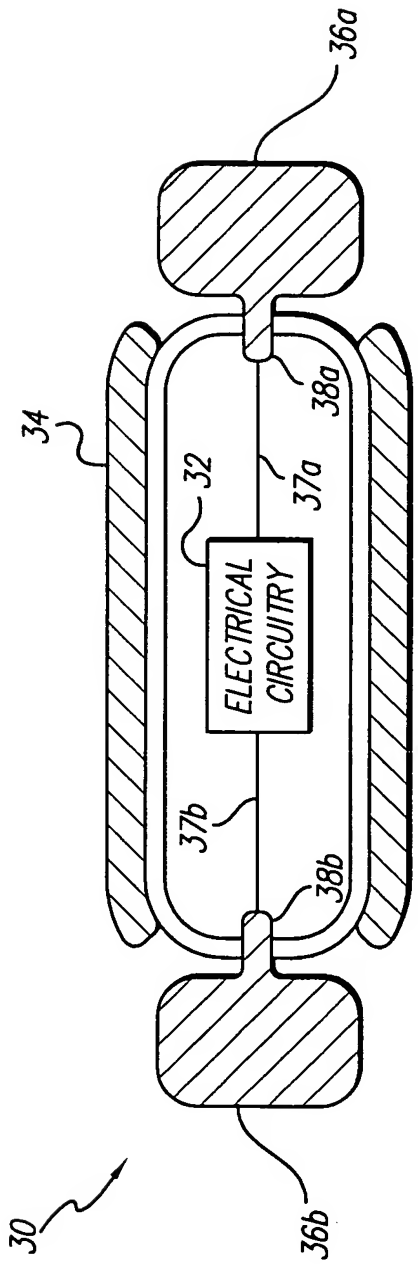

30
34
36a
36b
32
ELECTRICAL CIRCUITRY
37a
37b
38a
38b

FIG. 2

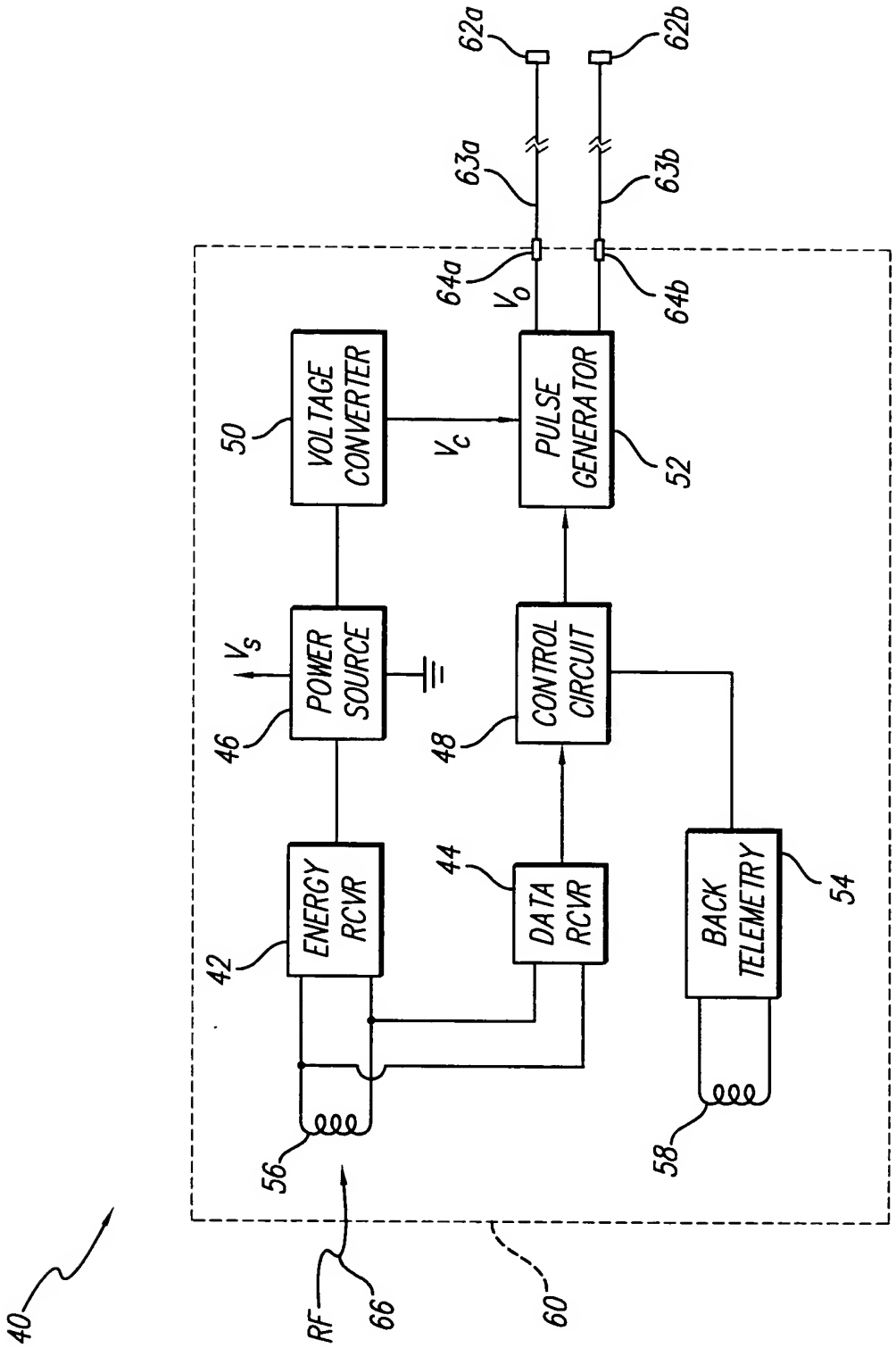

40
RF
66
60
56
58
42
ENERGY RCVR
44
DATA RCVR
54
BACK TELEMETRY
46
POWER SOURCE
V_s
48
CONTROL CIRCUIT
50
VOLTAGE CONVERTER
V_c
PULSE GENERATOR
52
64a
V_o
64b
63a
63b
62a
62b

FIG. 3

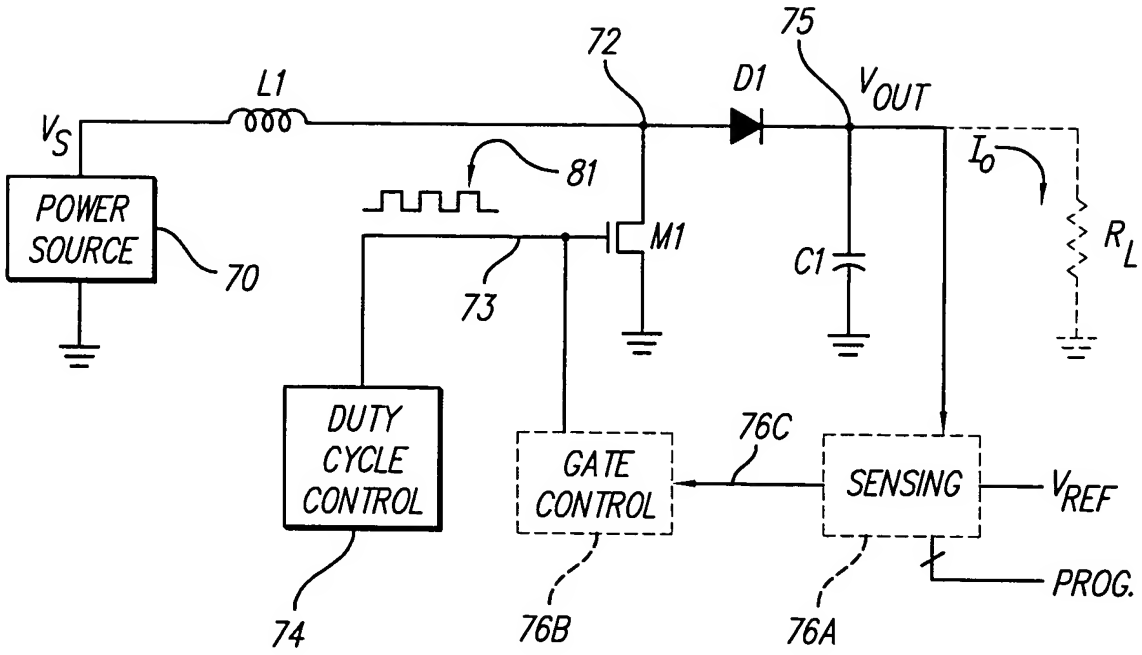
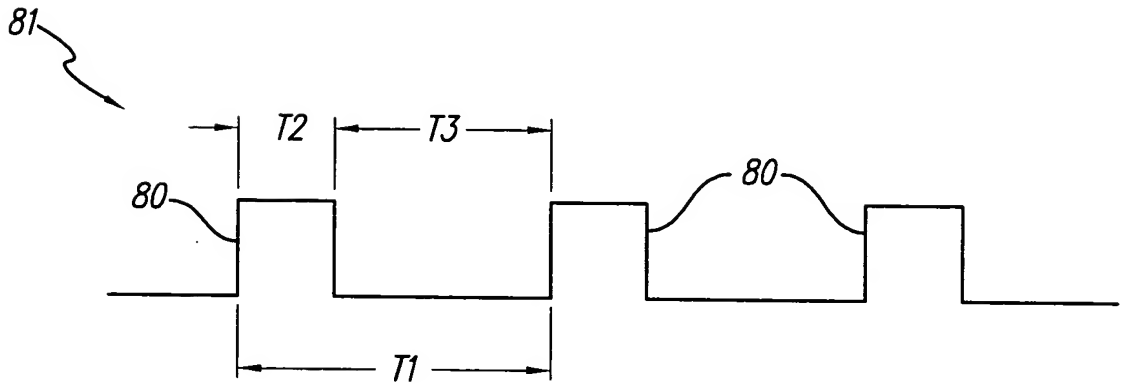


FIG. 4



T2/T1 = DUTY CYCLE

FIG. 5

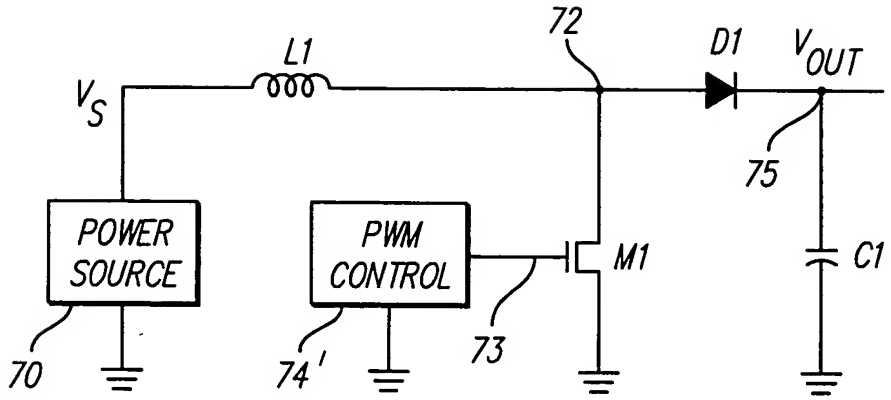

L1
72
D1
V_{OUT}
V_S
75
POWER SOURCE
PWM CONTROL
M1
C1
70
74'
73

FIG. 6A

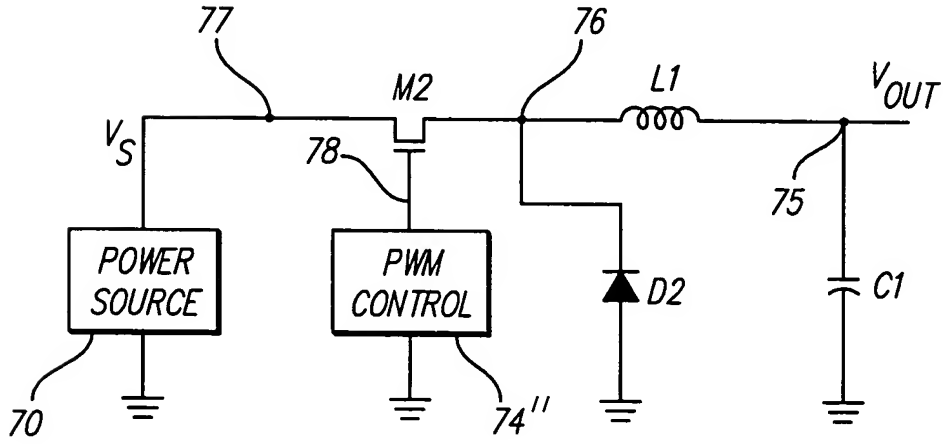

77
76
M2
L1
V_{OUT}
V_S
78
75
POWER SOURCE
PWM CONTROL
D2
C1
70
74''

FIG 6B

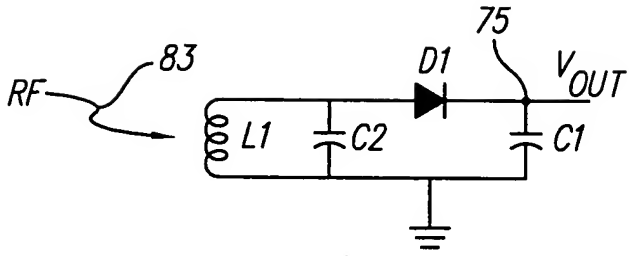


FIG. 6C

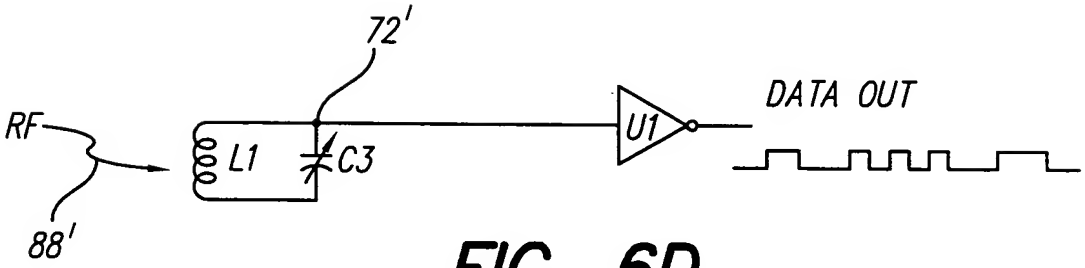


FIG. 6D

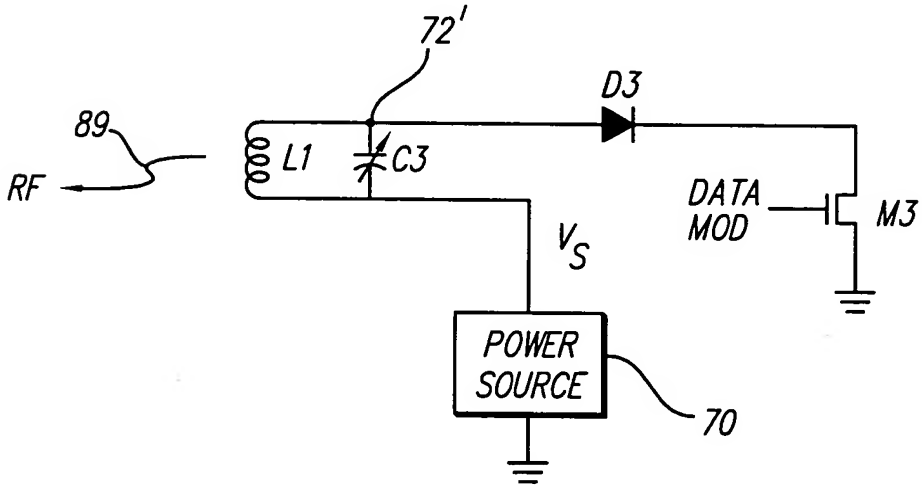


FIG. 6E

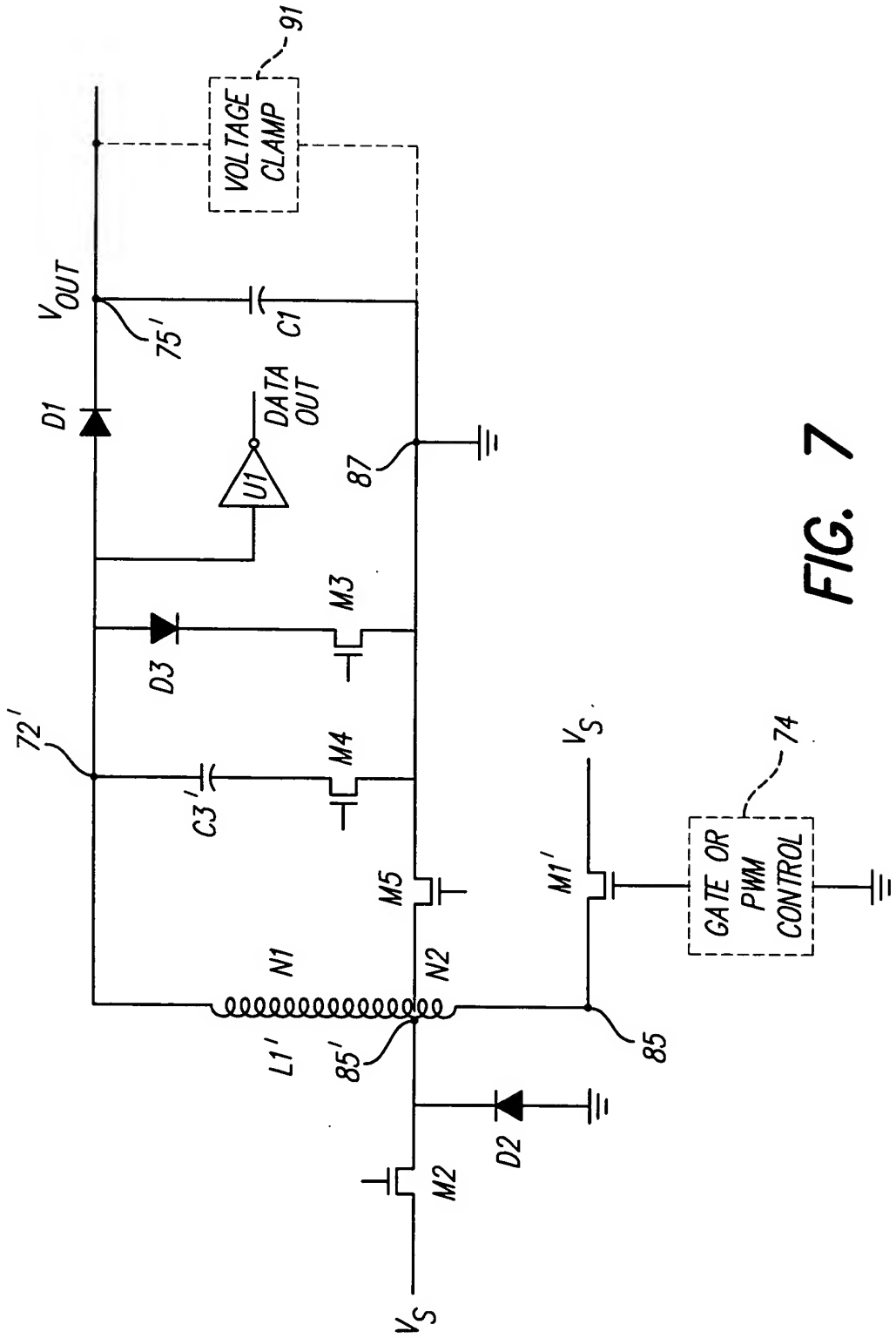

VOLTAGE CLAMP
91
V_{OUT}
75'
C1
D1
DATA OUT
U1
87
M3
D3
72'
C3'
M4
V_S
74
M5
M1'
GATE OR PWM CONTROL
N1
N2
L1'
85'
85
D2
M2
V_S

FIG. 7

MODE	M1'	M2	M3	M4	M5
STEP UP	ON	OFF	PWM ON	OFF	OFF
STEP DOWN	OFF	PWM ON	OFF	OFF	OFF
ENERGY RECEIVE	OFF	OFF	OFF	ON	ON
DATA RECEIVE	OFF	OFF	OFF	ON	ON
DATA XMIT	ON	OFF	MODULATION ON	ON	ON

FIG. 8